

**ABSTRACT OF THE DISCLOSURE**

A method of identifying endmember spectral values from multispectral image data, where each multispectral data value is equal to a sum of mixing proportions of each endmember spectrum. The method comprises the steps of processing the data to obtain a multidimensional simplex having a number of vertices equal to the number of endmembers. The position of each vertex represents a spectrum of one of the endmembers. Processing the data is conducted by providing starting estimates of each endmember spectrum for each image data value. The mixing proportions for each data value is estimated from estimates of the spectra of all the endmembers. The spectrum of each endmember is estimated from estimates of the mixing proportions of the spectra of all the endmembers for each image data value. The estimation steps are repeated until a relative change in the regularised residual sum of squares is sufficiently small. The regularised residual sum of squares includes a term which is a measure of the size of the simplex.